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Press Kit

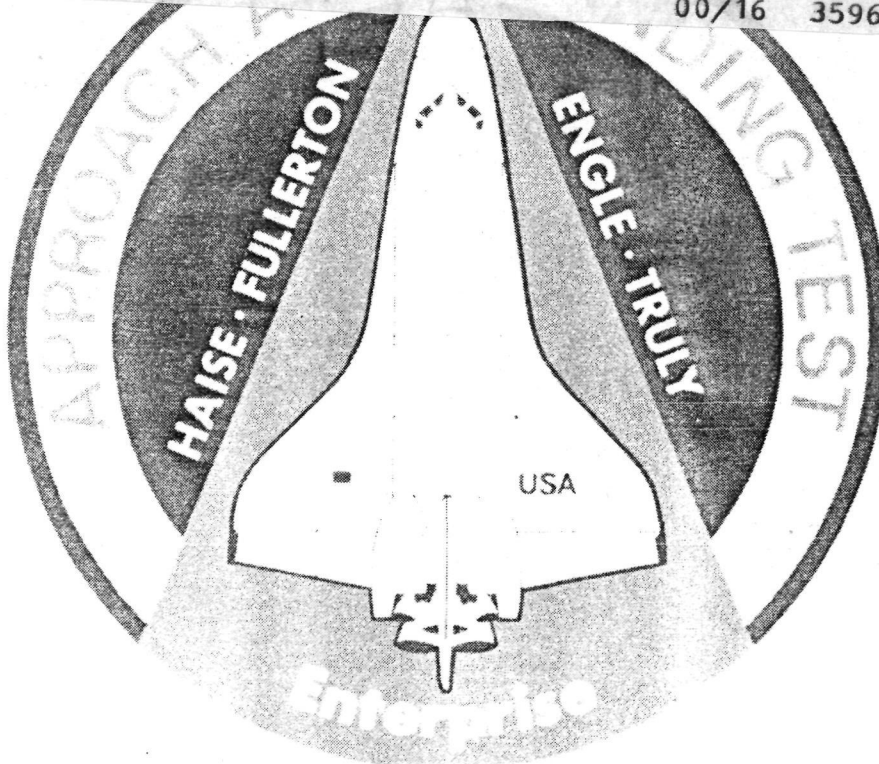
Project SPACE SHUTTLE ORBITER
CAPTIVE MANNED TEST
FLIGHT SERIES

RELEASE NO: 77-117

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ORBITER CAPTIVE MANNED TEST FLIGHT SERIES
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For Release

IMMEDIATE

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RELEASE NO: 77-117

SPACE SHUTTLE CAPTIVE MANNED TEST FLIGHT SERIES TO BEGIN

The first manned test flights of the Space Shuttle Orbiter "Enterprise" are scheduled to begin at NASA's Dryden Flight Research Center, Edwards, Calif., no earlier than June 16, 1977. Four flights are planned with the Orbiter attached to but not released from its Boeing 747 carrier aircraft.

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NASA astronauts will be at the controls of the Enterprise during these captive flights, the second flight phase of the Shuttle Approach and Landing Tests (ALT) (NASA Release 77-16). The third phase of the program, which calls for the Orbiter to be released from the Boeing 747 carrier aircraft, will follow successful completion of this flight series.

Astronauts Fred W. Haise and Charles G. Fullerton will be the first Orbiter crew for the first and third flights and astronauts Joe H. Engle and Richard H. Truly are the Orbiter crew members for flights two and four.

The Orbiter/747 combination logged more than 11.5 hours flight time during five captive inert flights in the initial phase of ALT which was successfully concluded March 2, 1977. The Orbiter has been undergoing final verification testing and systems checkout for the past several months at Dryden Center.

All subsystems aboard the Orbiter will be active during these captive active flights designed to verify crew procedures and systems operations and determine the optimum separation profile for the manned free flights.

The captive active flights and their primary objectives are:

Flight 1 -- The 747 carrier aircraft (SCA) will reach an altitude of 4,572 meters (15,000 feet) for a series of flutter checks, control stick steering checks, deployment of the Orbiter speed brakes and Tactical Air Navigation System (TACAN) range and bearing tests at speeds which will not exceed 333 kilometers per hour (180 knots). The SCA will fly two times around the racetrack during the 49-minute test flight.

Flight 2 -- The second manned Orbiter mated test flight will go to an altitude of 7,225 m (23,700 ft.) and fly three times around the racetrack course approximately 67 by 24 km (40 by 14 miles). The Orbiter crew will perform normal operational checks and systems operations. During this flight, low speed 417 km/hr (225 kts) and high speed 480 km/hr (260 kts) flutter checks will be performed to evaluate Orbiter structural dynamic response characteristics. On the second circuit around the racetrack, a pushover and separation trajectory will be flown at 480 km/hr (260 kts) to collect separation performance data. About five minutes later speed brake evaluation will be performed at an altitude of 6,614 m (21,700 ft.). The flight duration is about one hour.

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Flight 3 -- This flight is dedicated to the verification of separation conditions and tolerances, as well as checks of the Orbiter's avionics systems and further procedures development. As in the first flight, the 747 will fly three times around the racetrack trajectory. On the inbound leg of the second circuit a pushover and separation trajectory will be flown at 500 km/hr (270 kts) to collect separation performance data. During final descent, the SCA/Orbiter mated configuration will fly through the automatic landing system (autoland) trajectory. Flight duration will be 62 minutes.

Flight 4 -- The fourth flight, a dress rehearsal for the free flights, is dedicated to further refinement and demonstration of separation procedures (short of actual release). The flight is scheduled to last 55 minutes.

MATED PROFILE CAPTIVE ACTIVE 1

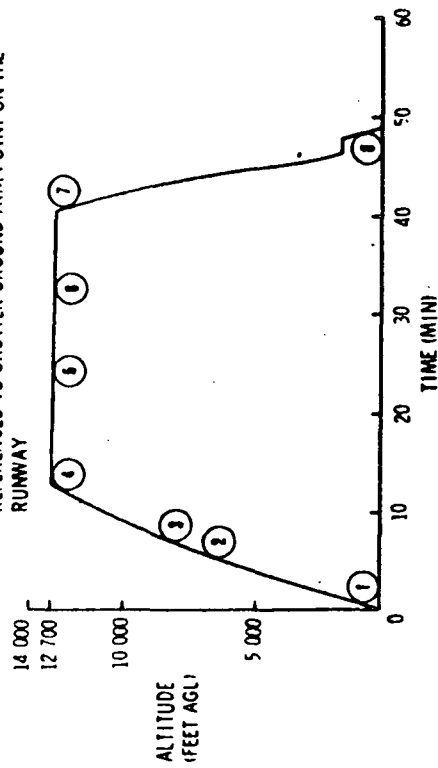
FLIGHT SEQUENCE

RACETRACK CIRCUIT	ITEM	TIME (MIN)	ALTITUDE (FEET AGL)	RANGE (NM)	EVENT
	1	0	0	0	SCA TAKEOFF
1	2	6	6 500	15	FCS DIRECT MODE CHECK
1	3	8	8 100	21	FLUTTER CHECK
1	4	15	12 700	30	SPEED BRAKE TEST
1	5	25	12 700	11	CSS MODE & POLARITY CHECK
2	6	33	12 700	32.5	TACAN RANGE AND BEARING TEST
2	7	40	12 700	15	SCA BEGIN DESCENT
	8	49	0	0	SCA TOUCHDOWN

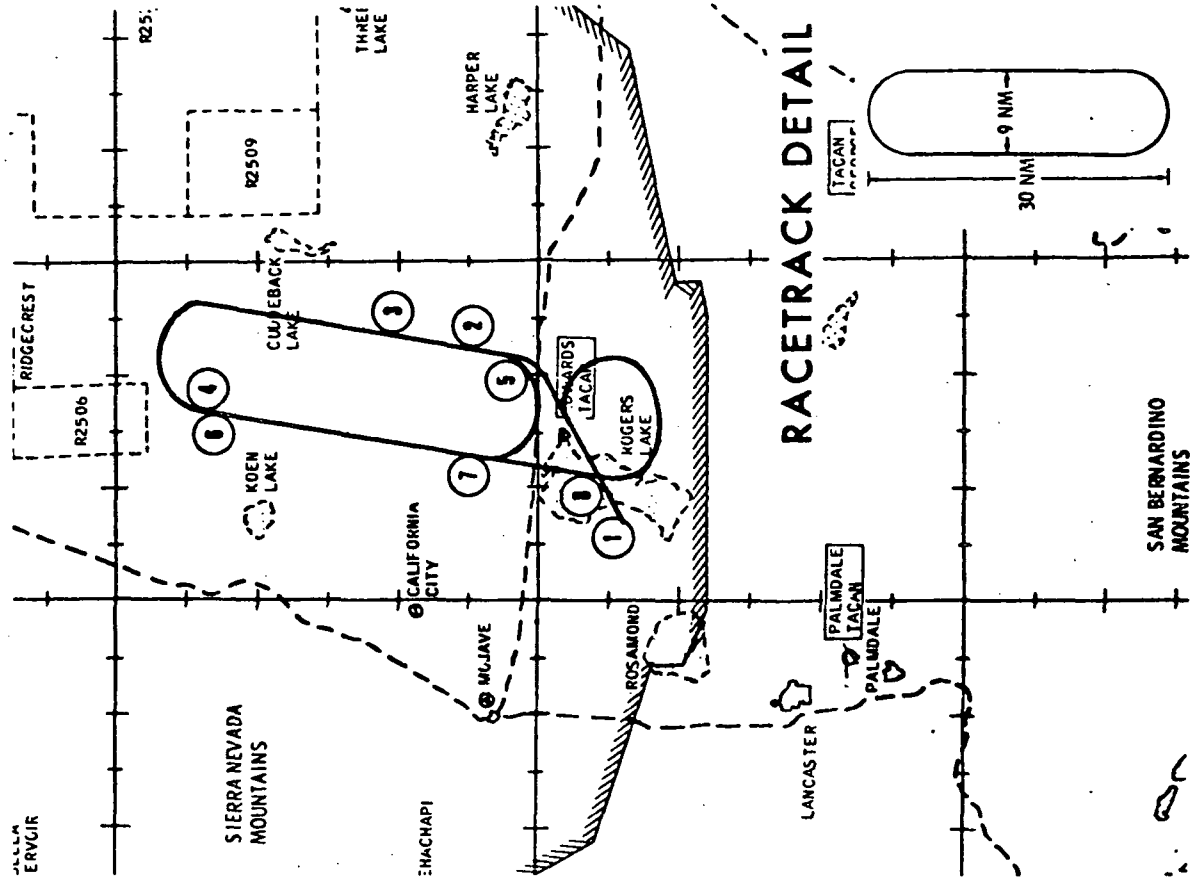
NOTE: THERE ARE 2 GO AROUNDS TO THE CA 1A RACETRACK

ALTITUDE PROFILE

NOTE: ALTITUDES ARE ABOVE GROUND LEVEL (AGL) AND ARE REFERENCED TO ORBITER GROUND AIM POINT ON THE RUNWAY



GROUNDTRACK



MATED PROFILE CAPTIVE ACTIVE 2

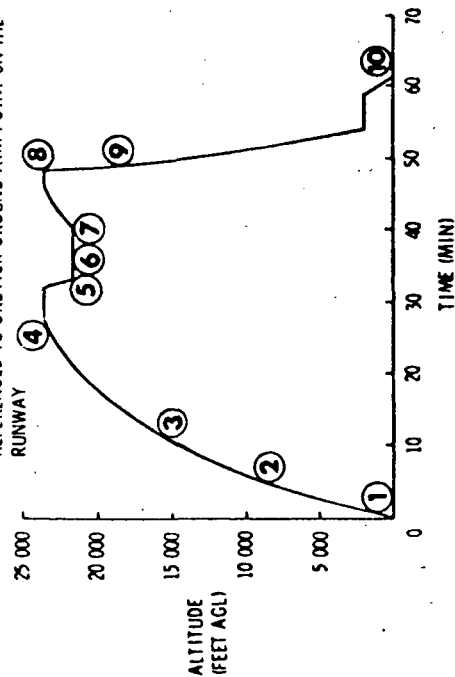
FLIGHT SEQUENCE

RACETRACK CIRCUIT	ITEM	TIME (MIN)	ALTITUDE (FEET AGL)	RANGE (NM)	EVENT
	1	0	0	0	SCA TAKEOFF
1	2	6	9 705	16	INTERSECT RACETRACK. FLUTTER CHECK AT 225 KEAS
1	3	14	15 000	36	SPEED BRAKE TEST (225 KEAS)
2	4	30	23 705	40	SCA BEGIN SRT PUSHOVER AND ACCELERATE TO 260 KEAS
2	5	33	21 705	26	FLUTTER CHECK AT 260 KEAS
2	6	35	21 705	16	PERFORM SPEED BRAKE EVALUATION
3	7	40.5	21 715	22	START CLIMB BACK TO 23 705 FT AGL
3	8	48	23 705	32	START SEP DATA RUN AT 260 KEAS
3	9	49	18 005	24	END SEP DATA RUN
	10	61	0	0	SCA TOUCHDOWN

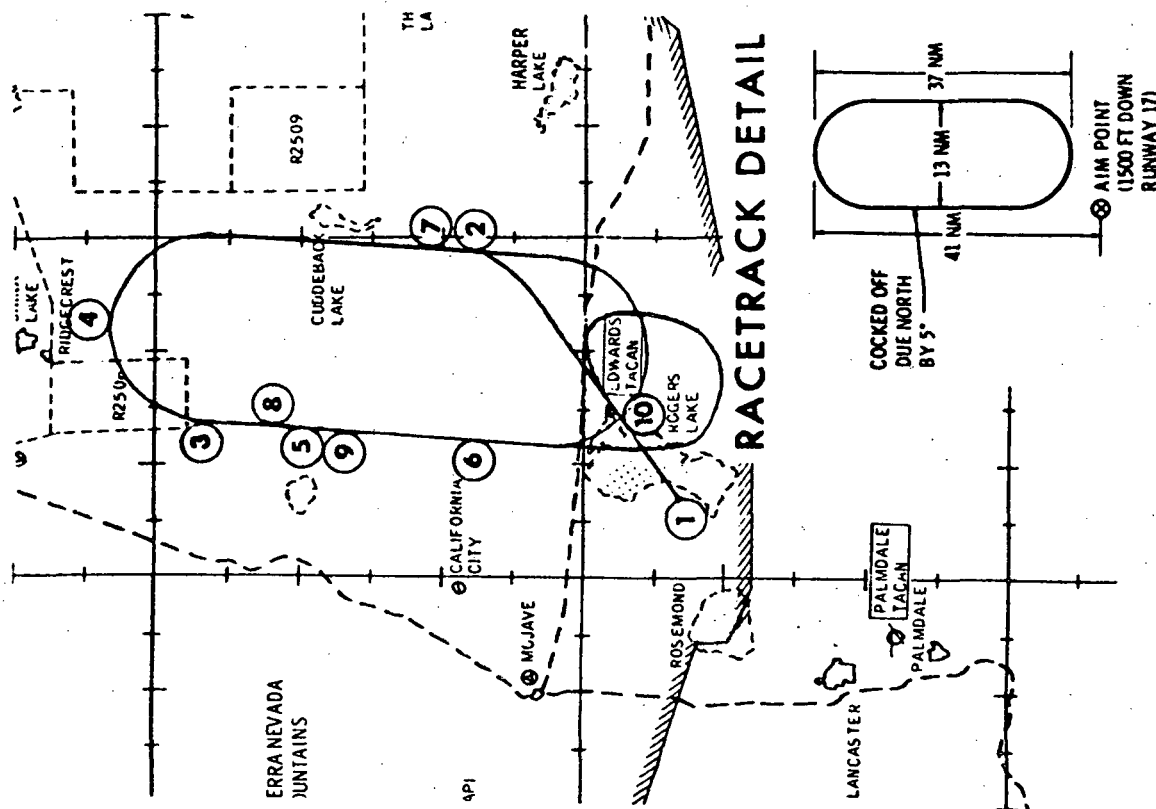
NOTE: THERE ARE 3 GO AROUNDS TO THE CA 1 RACETRACK.

ALTITUDE PROFILE

NOTE: ALTITUDES ARE ABOVE GROUND LEVEL (AGL) AND ARE REFERENCED TO ORBITER GROUND AIM POINT ON THE RUNWAY



GROUNDTRACK



MATED PROFILE CAPTIVE ACTIVE 3

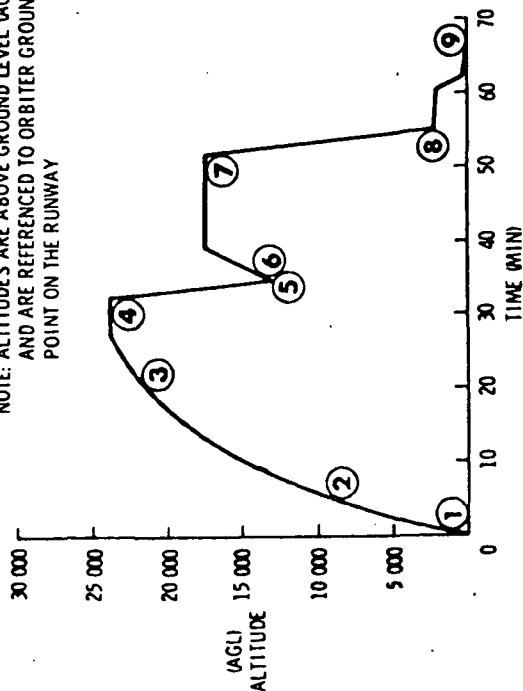
FLIGHT SEQUENCE

RACETRACK CIRCUIT	ITEM	TIME (MIN)	ALTITUDE (FEET AGL)	RANGE (NM)	EVENT
	1	0	0	0	SCA TAKEOFF
1	2	6	9 705	16	INTERSECT RACETRACK
2	3	22	21 705	9	IN-FLIGHT FCS CHECKS
2	4	32	23 605	35	START SEP DATA RUN AT 270 KEAS
2	5	33.6	13 205	26	END SEP DATA RUN
2	6	34	13 205	24	START CLIMB TO 17 205 FT AGL
3	7	52	17 205	21	PUSHOVER FOR AUTOLAND TEST
	8	55	2 005	4	END AUTOLAND TEST
	9	63	0	0	SCA TOUCHDOWN

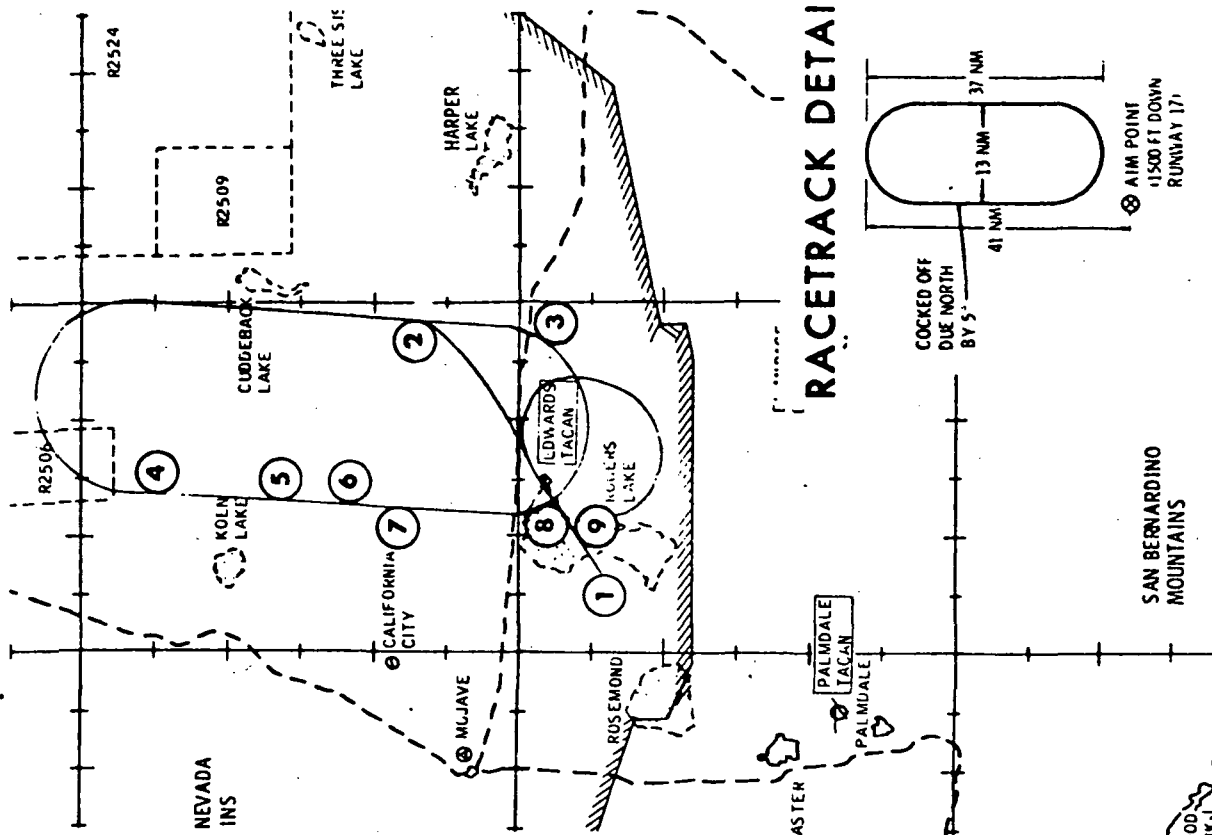
NOTE: THERE ARE 3 GO AROUNDS TO THE CA2 RACETRACK.

ALTITUDE PROFILE

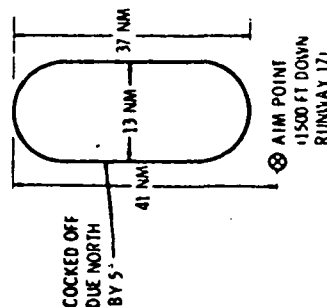
NOTE: ALTITUDES ARE ABOVE GROUND LEVEL (AGL) AND ARE REFERENCED TO ORBITER GROUND AIM POINT ON THE RUNWAY



GROUNDTRACK



RACETRACK DETAIL



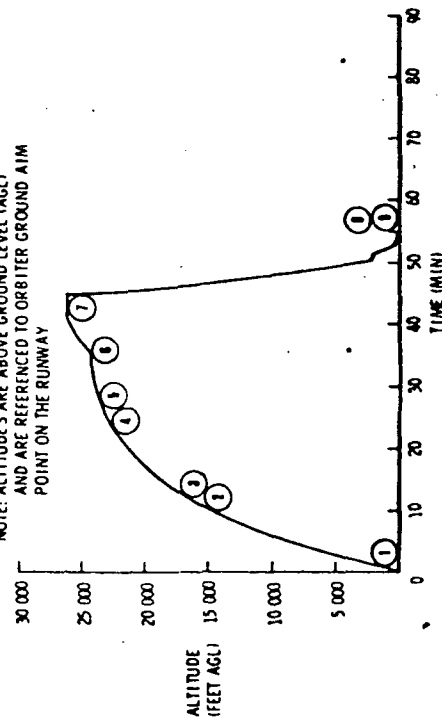
MATED PROFILE CAPTIVE ACTIVE 4

FLIGHT SEQUENCE

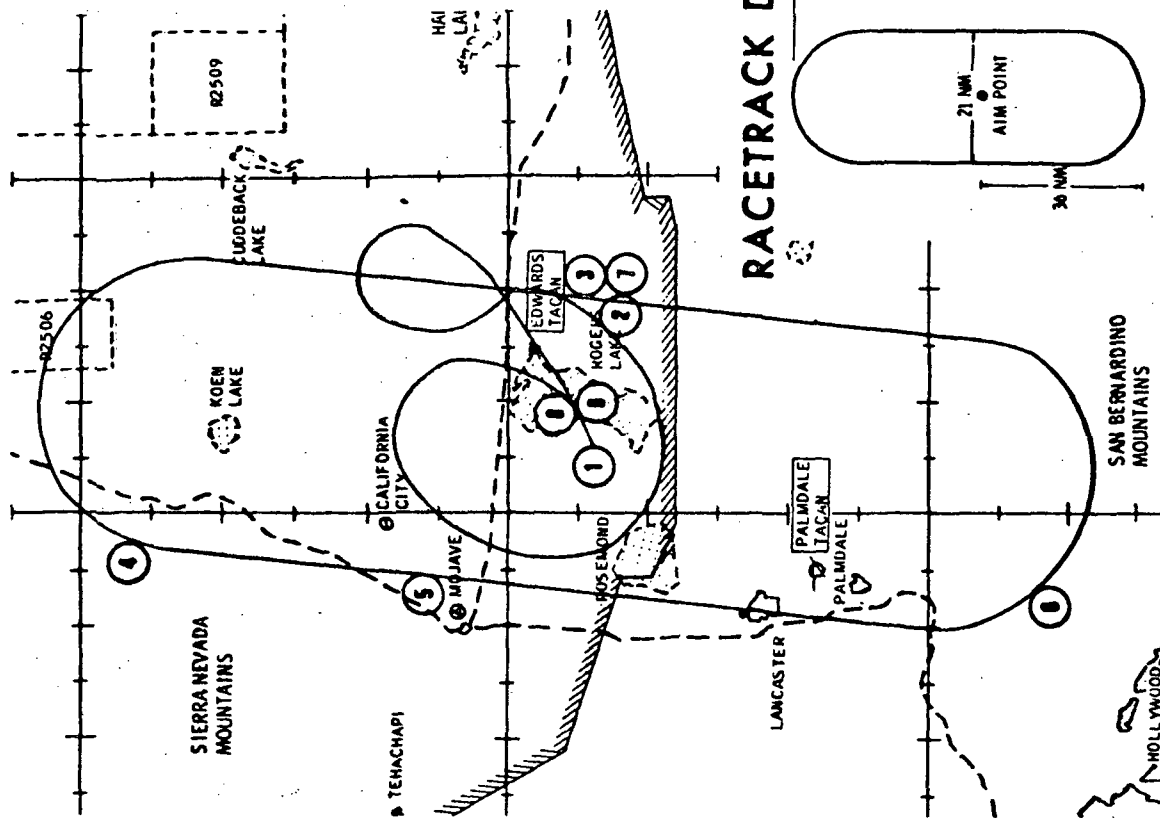
ITEM	TIME (MIN)	ALTITUDE (FEET AGL)	RANGE (NM)	EVENT
1	0	0	0	SCA TAKEOFF
2	12	16 405	10	TACAN RANGE & BEARING TESTS
3	13	16 905	12	INTERSECT RACETRACK
4	24	22 705	26	IN-FLIGHT FCS CHECKS
5	28	23 605	16	REACH MCT 200 FPM CEILING
6	36	24 705	29	SCA BEGIN SRT
7	45	25 905	9.5	PUSHOVER (PRACTICE SEP)
8	55	0	0	SCA TOUCHDOWN
9	55.5	0	0	DEPLOY LANDING GEAR DURING ROLLOUT AT ~125 KCAS

ALTITUDE PROFILE

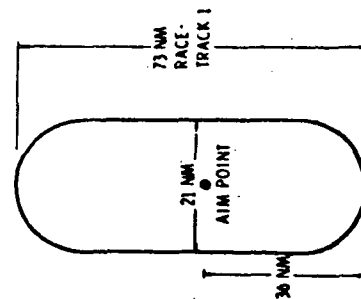
NOTE: ALTITUDES ARE ABOVE GROUND LEVEL (AGL) AND ARE REFERENCED TO ORBITER GROUND AIM POINT ON THE RUNWAY



GROUNDTRACK



RACETRACK DETAIL



CAPTIVE ACTIVE TIMELINE *

<u>Event</u>	<u>Altitude</u>	<u>Time</u>	<u>PDT</u>	<u>EDT</u>
(Preflight)				
Crew Ingress		T-104	6:16	9:16
Umbilical Pullout		T-78	6:42	9:42
Orbiter/SCA Move from Mate/Demate		T-62	6:58	9:58
SCA Engine Start		T-42	7:18	10:18
SCA Begin Taxi		T-32	7:28	10:28
SCA Arrive Runway		T-12	7:48	10:48
SCA Brake Release & Takeoff		T-0	8:00	11:00

Flight 1

Flight Control System (FCS) Check	6,500	T+06	8:06	11:06
Flutter Check	8,100	T+08	8:08	11:08
Speed Brake Test	12,700	T+15	8:15	11:15
Inflight FCS Check	12,700	T+24	8:24	11:24
Begin Descent	12,700	T+40	8:40	11:40
Touchdown		T+49	8:49	11:49

<u>Event</u>	<u>Altitude</u>	<u>Time</u>	<u>PDT</u>	<u>EDT</u>
<u>Flight 2</u>				
Intersect Racetrack	9,705 (AGL)**	T+6	8:06	11:06
Rated Thrust & Pushover & Accelerate to 260 KEAS for High Speed Flutter Check		T+30	8:30	11:30
Speedbrake Evaluation	21,705	T+35	8:35	11:35
Climb Back to 23,700	23,705	T+40.5	8:40.5	11:40
Sep. Data Run 260 KEAS	23,705	T+48	8:48	11:48
End Sep. Run	18,005	T+49	8:49	11:49
Touchdown (SCA Orbiter)		T+61	9:01	12:01

<u>Flight 3</u>				
Intersect Racetrack	9,705	T+06	8:06	11:06
Flight Control System Check	21,705	T+22	8:22	11:22
Sep. Data Run 270 kts.	23,605	T+32	8:32	11:32
End Sep. Data Run	13,205	T+33.6	8:33	11:33
Climb back to 17,205 ft.		T+34	8:34	11:34
Pushover for Autoland Test	17,205	T+52	8:52	11:52
End Autoland	2,005	T+55	8:55	11:55
Touchdown		T+63	9:03	12:03

<u>Event</u>	<u>Altitude</u>	<u>Time</u>	<u>PDT</u>	<u>EDT</u>
<u>Flight 4</u>				
Tactical Air Navigation Range & Bearing Tests	16,405	T+16	8:16	11:16
Inflight Flight Control System Checks	22,705	T+24	8:24	11:24
SCA Begin Special Rated Thrust	24,705	T+36	8:36	11:36
Pushover-Practice Separation	25,905	T+45	8:45	11:45
Touchdown & Deploy Orbiter Landing Gear		T+55	8:55	11:55

Note

* Events and times are preliminary and may change prior to flight day.

** Altitudes are above Ground Level (AGL) and are referenced to Orbiter ground aim point on the runway. Add 2,300 ft. to AGL to obtain altitude above Mean Sea Level (MSL).

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